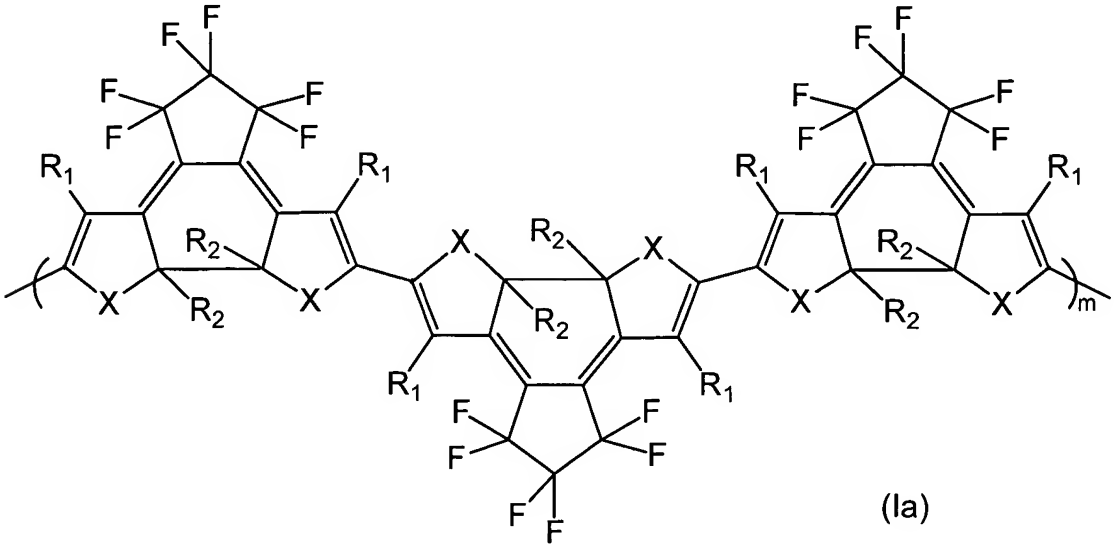
IN THE CLAIMS:

Please cancel claims 1-12 without prejudice or disclaimer, and substitute new Claims 13-30 therefor as follows:

Claims 1-13 (Cancelled).

13. (New) An optical waveguide comprising a matrix and an optical path including a photochromic diarylethene polymer having the general formula (Ia)



(Ia)

wherein

X is S, O, Se, Te, or N-R, wherein R is hydrogen or a linear or branched (C_{1-12})alkyl group;

R_1 is hydrogen, a linear or branched (C_{1-12})alkyl or (C_{1-12})alkoxy group;

R_2 is a linear or branched (C_{1-12})alkyl group; and

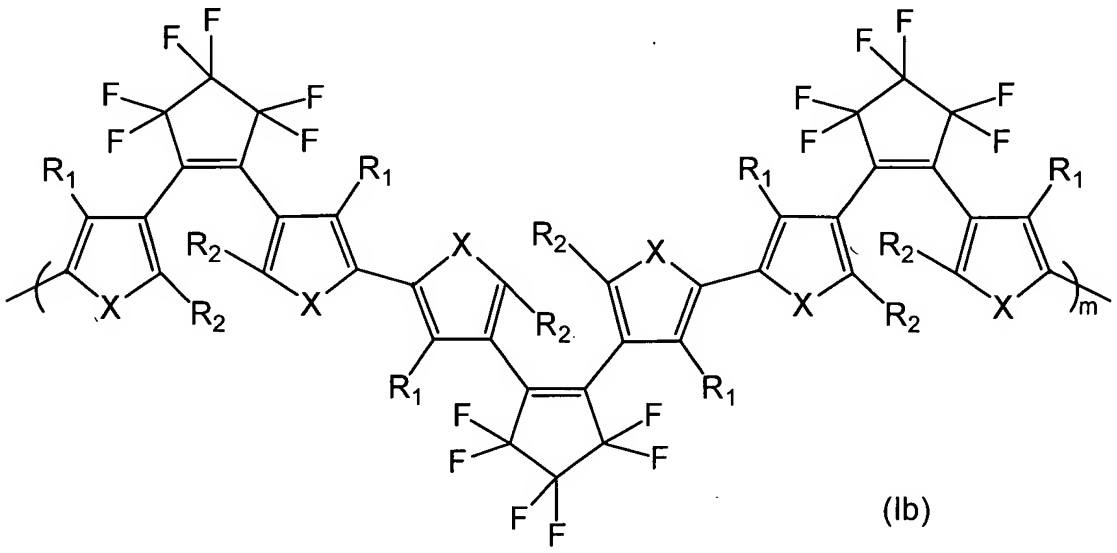
m = 4-100.

14. (New) The optical waveguide according to claim 13, wherein X is S, Se or Te.

15. (New) The optical waveguide according to claim 14, wherein X is S.

16. (New) The optical waveguide according to claim 13, wherein R_1 is hydrogen or a (C_{1-3})alkyl group.

17. (New) The optical waveguide according to claim 13, wherein the optical path is surrounded by a matrix comprising a photochromic diarylethene polymer having the general formula (Ib)



(Ib)

wherein

X is S, O, Se, Te, or N-R, wherein R is hydrogen or a linear or branched (C_{1-12})alkyl group;

R_1 is hydrogen, a linear or branched (C_{1-12})alkyl or (C_{1-12})alkoxy group;

R_2 is a linear or branched (C_{1-12})alkyl group; and

m = 4-100.

18. (New) The optical waveguide according to claim 17, wherein X is S, Se or Te.

19. (New) The optical waveguide according to claim 18, wherein X is S.

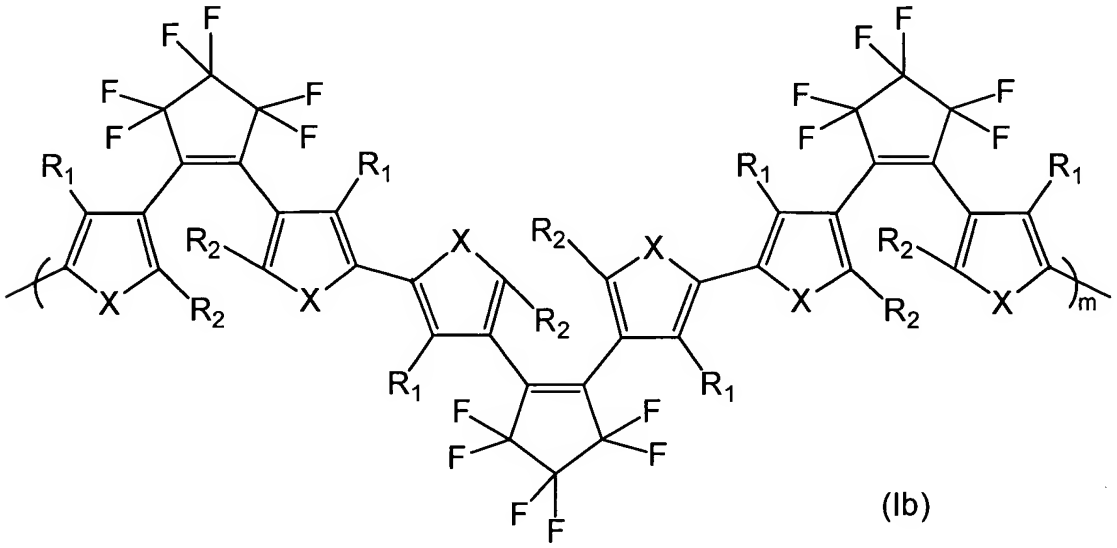
20. (New) The optical waveguide according to claim 17, wherein R_1 is hydrogen or a (C_{1-3})alkyl group.

21. (New) The optical waveguide according to claim 13, wherein said photochromic diarylethene polymer is dispersed in said matrix.

22. (New) The optical waveguide according to claim 13, wherein said matrix is selected from polystyrene, polymethylmethacrylate (PMMA), polycarbonate, polysulphone, polyimide, fluorinated or deuterated PMMA, and mixtures thereof.

23. (New) A method for the preparation of an optical waveguide comprising the steps of:

a) dissolving in an organic solvent a photochromic diarylethene polymer having formula (1b)

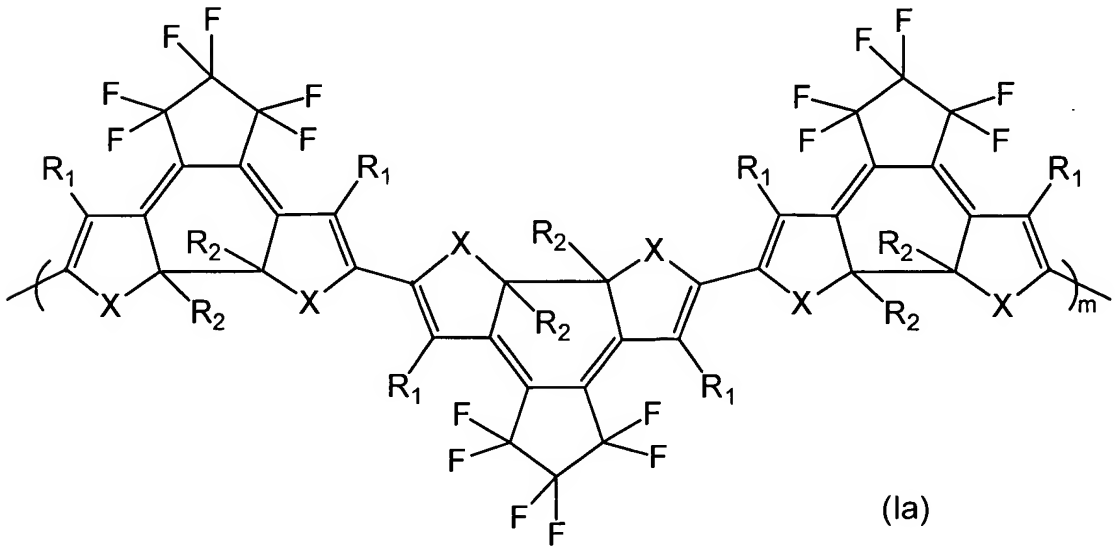


(Ib)

b) mixing the thus obtained solution and a polymeric matrix until a dispersion is obtained;

c) preparing a film by depositing said dispersion on a substrate; and

d) irradiating said film so as to form an optical path comprising a photochromic diarylethene polymer having formula (Ia)



(Ia)

wherein in formula (1b) and (1a)

X is S, O, Se, Te, or N-R, wherein R is hydrogen or a linear or branched (C_{1-12})alkyl group;

R_1 is hydrogen, a linear or branched (C_{1-12})alkyl or (C_{1-12})alkoxy group;

R_2 is a linear or branched (C_{1-12})alkyl group; and

m = 4-100.

24. (New) The method according to claim 23, wherein X is S, Se or Te.

25. (New) The method according to claim 24, wherein X is S.

26. (New) The method according to claim 23, wherein R_1 is hydrogen or a (C_{1-3})alkyl group.

27. (New) The method according to claim 23, wherein the organic solvent is a chlorinated solvent.

28. (New) The method according to claim 23, wherein the photochromic diarylethene polymer of the invention is dissolved in said matrix at a concentration not higher than 20% by weight.

29. (New) The method according to claim 28, wherein said concentration is between 0.1% and 15% by weight.

30. (New) The method according to claim 29, wherein the concentration is between about 5 and about 10% by weight.